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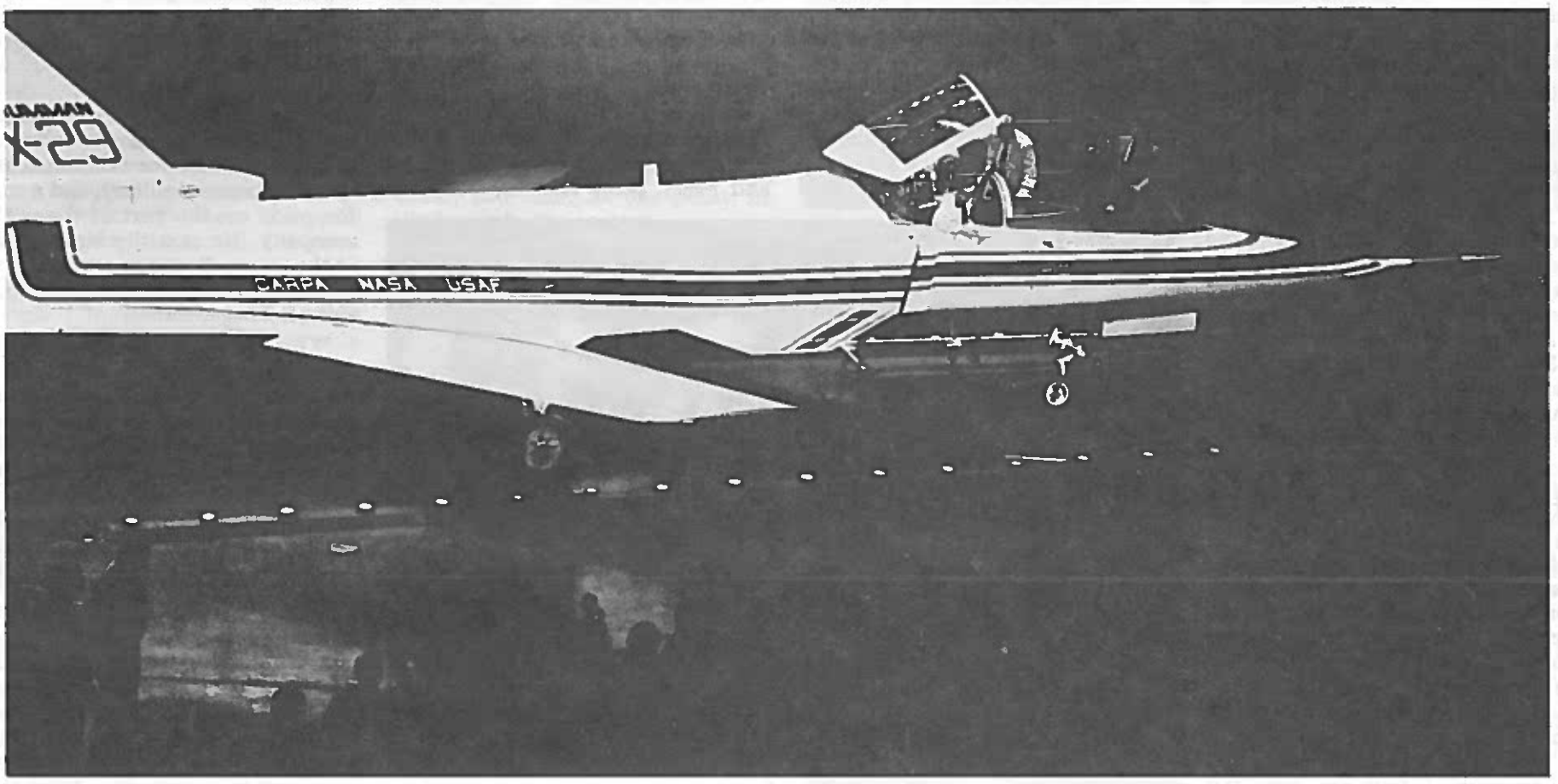


Forward to new frontiers–X-29 premieres

On Monday, August 27, Grumman introducted the X-29 advanced technology demonstrator aircraft at rollout ceremonies held at Calverton. Close to 2,000 cheered as the curtain rose and the spotlight centered on the red, white and blue X-29.

The first U.S. government-sponsored X-plane in more than a decade, the X-29 is also Grumman's first experimental X-plane.

Guest of honor at the rollout was Vice President George Bush. After the official premiere, Bush (photo at left) climbed into the X-29 cockpit for a closer look at the sleek aircraft with its distinctive forward swept wings. Assisting him were Grumman Corporation Chairman Jack Bierwirth and Grumman Chief Test Pilot Chuck Sewell. More coverage of the X-29 rollout on the following pages.

Bush: X-29 important step in rebuilding

In a dazzling rollout ceremony highlighted by the remarks of United States Vice President George Bush, Grumman Aerospace unveiled the X-29 advanced technology demonstrator aircraft, on Monday, August 27.

More than 2,000 people were on hand for the ceremony, which was held in the Plant 7 hangar at Calverton Operations. The X-29 is an experimental aircraft that will test a number of advanced aeronautical concepts. It is aimed toward creating a new generation of small, fuel efficient fighters capable of performing a full range of missions, and is the first "X" aircraft in over a decade to be produced with government backing.

The X-29 program began at Grumman in 1981, when it won the contract to produce two X-29 aircraft for the Defense Advanced Research Projects Agency (DARPA). In addition to the $93 million of DARPA's funds that have been invested in the X-29, Grumman has invested $40 million — including $25 million in 1984.

Stronger defenses

Clutching a model of the X-29 presented to him by Grumman Corporation Chairman Jack Bierwirth during the rollout ceremony, Vice President Bush remarked that the aircraft is just the latest in a long series of Grumman innovations.

"On behalf of the President and all America, I flew up here this morning just to say thank you," Bush said. "I'm proud to be here as well, proud because today, in a sense, marks another chapter in the strengthening of America's defenses. You know the story. We have beefed up our military, including advances in training and increases in basic supplies, ammunition, and weapons . . . Pay, spare parts, and training were our definite priorities. More than half of our defense budget increases have been in those areas.

"In the rebuilding of our defenses, another priority has been new weapons development," Bush continued. "And that's where the X-29 comes in. We're determined not to neglect the technological edge that we must rely on to keep up with the mounting Soviet lead in weapons production."

Bush said he expects the X-29's advanced technologies to become part of many future aircraft. As such, he called the aircraft "an important step in the rebuilding of an American defense 'second to none.' "

He pointed out that technology, and the support of it by government, transcends both politics and ideology. He also reminded his listeners that technological advances take time — and he said the Navy's World War II aircraft were an example.

"I was a Navy pilot, a torpedo bomber pilot, in the Second World War," he said. "The plane I flew, and every plane the Navy used in the war, was already on the drawing board at the time the war began.

"While I'm at it," he added, "as one who accounted for the loss of two Grumman Avenger torpedo bombers back in 1944 . . . What a fantastic airplane. Stable. Great to land on a carrier. The men and women who put their know-how into that airplane, whether in engineering or putting them all together, did a great job — a job that Grumman continues to do."

Historic occasion

Grumman Aerospace President George Skurla called the rollout a historic occasion for Grumman and its Aerospace subsidiary, and a time for pride on the part of the entire company. He said the large crowd at the proceedings was testimony to the excitement that the latest X-aircraft has generated.

"Once again, we at Grumman are proud to be playing a key role in our nation's commitment to remaining first and foremost in aerospace technology," he remarked. "While most of the X-planes of the past were built to explore one or two aeronautical concepts, the X-29 represents no less than eight advanced technological concepts, of which its forward-swept wing is only one.

"The integration of these multiple state-of-the-art technologies into a single effort represents a major leap forward in aircraft aerodynamic, structural, and avionics engineering," he continued. "We are confident that the X-29 will prove to be a research testbed of great value to this country in the years ahead as our 21st Century military and commerical aircraft configurations begin to evolve."

"The X-29's unprecedented technological challenges have demanded and received major investments of our corporate resources, both in terms of dollars and people talent," Skurla said. "We believe these are wise and timely investments in our future and through programs like these, we intend to lead the way in our industry with the same technical excellence that has been the Grumman hallmark for the past 54 years."

Skurla ended his remarks with the presentation of a crystal plaque engraved with the design of the X-29 to DARPA Director Dr. Robert Cooper. Cooper noted that "five years ago, the idea of an experimental aircraft to test out the technologies that George outlined earlier was only an idea in the mind of Norris Krone. He took that idea to his colleagues and they all agreed that the only way to move

Keynote speaker. *Grumman Chairman Jack Bierwirth (R) introduces Vice President George Bush to the X-29 rollout ceremony audience.*

Proud smiles. *Grumman Chairman Jack Bierwirth (far R) poses with (L to R): Bob Roemer, X-29 program director; Carol Ann Spacht; Glen Spacht, deputy director of X-29 Development; Chuck Sewell, Grumman chief test pilot; and Bob McGuckin, deputy director of X-29 Operations.*

Honored guest. *Rose Grumman, wife of Roy Grumman, meets Grumman Chief Test Pilot Chuck Sewell.*

an American defense 'second to none'

aeronautics technology forward was to get back into the experimental aircraft business and take risks by aggregating technology. The X-29 is the result of that."

'American institution'

Bierwirth presented a description of what makes up the "Grumman family." He called Grumman a peculiarly American institution founded by six men who worked alongside their original ten employees as equals. He also noted that stock ownership by Grumman employees and their families has risen to approximately 55 percent of publicly-owned shares.

"In addition to a sense of cooperative ownership, there is a sense of belonging," he noted. "A great many of the people here are second and third generation Grumman people." In Bierwirth's view, that sense of belonging results not only in a good working environment, but in a better ability for the company to make investments for the future.

"We can make a long-term commitment to the development of the high technology that the customer will require, to a degree that does not seem possible for the ordinary company that must watch its earnings per share, quarter by quarter," he said. "In meeting after meeting with Grumman people — and that includes the annual shareholders meeting — we have discussed our willingness to invest our earnings in the development of important technologies and important programs . . . And even though our reported earnings will be penalized and their stock will be for the moment decreased in value, their decision has been a unanimous and enthusiastic 'Go for it. Build for the future.'

"We can make a very special commitment to the United States and in doing so, we can continue to build the great company that Roy Grumman started in a garage in 1929," Bierwirth said. He ended by noting that the X-29 represented not only a substantial monetary investment by Grumman, but an investment of "personal dedication" by many Grummanites.

Sharing the dais with Bush, Bierwirth, Skurla, and Cooper were Grumman Corporation President Joe Gavin; Grumman Vice Chairman John Carr; Dan Huebner, Grumman Aerospace senior vice president, Marketing and Advanced Technology Development, who acted as master of ceremonies; U.S. Senator Daniel Moynihan (D-N.Y.); U.S. Senator Alfonse D'Amato (R-N.Y.), Congressman Joseph Addabbo, chairman of the Defense Appropriations Committee; U.S. Air Force Lt. Gen. Robert Russ, deputy chief of staff for Research, Development, and Acquisitions; Thomas Cooper, assistant secretary of the Air Force for Research Development, and Logistics, Capt. James Charles Jr., commanding officer, Naval Plant Representative Office; NASA Administrator James Beggs, and Col. Robert Monti, chaplain at McGuire Air Force Base.

The actual unveiling of the X-29 was a show stopper, a real treat for special effects enthusiasts. After the curtain was raised, Vice President Bush was escorted over to view the plane, newly painted red, white, and blue. At one point, he climbed into the cockpit.

The X-29 will be flight tested later this year by Grumman at Edwards Air Force Base in California.

Celebration. *Grumman Aerospace President George Skurla (L) talks with Sen. Alfonse D'Amato (R-NY) and Congressman Joseph Addabbo (R), chairman of the Defense Appropriations Committee, after the dramatic rollout of the X-29.*

'Way to go, Grumman!'

In addition to Vice President Bush, the roll-out of the X-29 attracted several other distinguished guests from the military, political, corporate and private walks of life. They offered some personal comments on the uniqueness of the X-29 and Grumman's involvement in the experimental aircraft program.

Chuck Sewell, Grumman's chief test pilot and the man who will be the first to fly the X-29, described the airplane as a "state-of-the-art technological achievement — and an aircraft that I am very excited about getting in and flying.

"Aside from all of the airplane's specific differences from other aircraft — the forward sweep of the wings, the composite material structure of the super-critical wing, the canards, and so on — from my standpoint of being in the driver's seat, I expect it to take off and come down just like any other airplane . . . .And, in between, to perform as well as all the pre-flight tests, computers and engineers say it will.

"As for flying an airplane this advanced, with all the computer systems built in, well I guess you could say that when I pull back on the stick I'm suggesting that I want my nose up. The computers take a vote and if two-out-of-three agree with me then I get the nose up. You might call me a manager of the flight control system in the X-29 cockpit," Chuck said.

Col. Jim Allburn, DARPA Program Manager for the X-29, described the rollout ceremony as a "very significant milestone in the experimental aircraft program. The

X-29 is really intended to follow the path of the previous X-series aircraft — to develop new technologies, to build confidence in new technologies, and make the transition to potential users whether they be in commercial or military applications," he stated.

"The most important challenge to the program still lies ahead. As we kick this machine in the air and evaluate the technologies and make the transition of information to a data base for use by industry, we can look forward to using what we learn to reduce the time, risk and cost of future aircraft development," Allburn added.

Senator Patrick Moynihan (D-NY) noted that the rollout ceremony was "a fine show and a really good time. It certainly is a proud moment for both Grumman and Long Island. I greatly enjoyed Vice President Bush's speech and I thought he spoke for all of us when he said how exciting this X-29 program is. The airplane resumes, after almost a 15-year break, the X-plane program and that is very good. Way-to-go, Grumman!"

Congressman Tom Downey (D-NY) commented that "having the X-29 and the experimental program on Long Island is tremendously exciting. It really is a step towards the future. The fact that it is being taken here on Long Island means that in the future when forward-swept wing fighters are built by the Navy and the Air Force they'll look for the people who designed the idea — and that's Grumman.

"I had seen the airplane before its unveiling today, but not painted. Today's show was very impressive. It was a high-tech show that really surprised me. When you think of Grumman, you think of a conservative company with solid engineering, but the roll-out show was really a flashy and exciting event. It had everything but a rock show's laser lights," Downey added.

The unveiling of the first new X-plane in over a decade and the visit to Grumman's Long Island home by Vice President Bush was certainly exciting. The spirit of the event was summed up by Rose Grumman, the wife of Roy Grumman, co-founder of the company that bears his name. Mrs. Grumman smiled and said, "It's a lovely day and a lovely airplane and something that everyone at Grumman can be proud of."

F-14, A-6 pact update

Sen. D'Amato attends ceremonial signing at Pl. 7

On Friday, August 17, Senator Alfonse D'Amato (R-N.Y.) joined Grumman Aerospace President George Skurla and Assistant Secretary of the Navy Everett Pyatt at Calverton for the ceremonial signing of a $1.14-billion dollar research-and-development contract for the F-14 and A-6 programs.

The Grumman-Navy F-14D contract calls for the full scale development of an upgrade of the avionics and the radar, and the re-engining of the F-14A. The Tomcat will get new General Electric F-110 engines in addition to fully digital avionics and new radar system.

The A-6 contract also calls for full scale development and modernization of the avionic and radar systems. In addition, significant survivability, reliability and maintainability improvements will be incorporated in the upgraded model. An improved A-6E upgraded engine is the subject of a separate government-conducted competition currently underway.

Skurla told attendees at the contract signing ceremony that the new pact would give "a new lease on life" for the F-14 and the A-6 production lines and "keep Grumman working up to its full potential into and beyond the 1990s."

Senator D'Amato added that the new contract "will mean a firm, secure and growing economic base for the Long Island region and the creation of hundreds of new jobs here at Grumman and through countless subcontractors across the region.

"Long Island's largest employer, Grumman, will see additional production contracts for advanced F-14s and A-6s amounting in excess of $10 billion dollars over the next decade as a result of today's signing," he added.

Speaking on behalf of the Secretary of the Navy, Pyatt said, "This contract represents a tribute to the people of Grumman who have continually maintained the highest level of quality in their work. The Navy is looking forward to the continuation of our relationship with Grumman and its record of excellence in the future of these two programs."

D'Amato praised the employees of Grumman, remarking, "The Navy recognized that in Grumman and its family of employees, they have found a national asset. They discovered it during the dark days of World War II when Grumman provided the Wildcats and Hellcats that met and defeated the Japanese. The Navy continues to be reminded of the workmanship and outstanding engineering found here at what is still called the Grumman 'Ironworks' — a label applied by Navy pilots who expect the best and toughest airplanes and get it from Grumman."

The senator also pointed to the fact that some additional Grumman engineers are expected to be hired as a result of the contract with the Navy. "It is vital that Grumman be provided with the high technology base that will make it competitive for future contracts. This award does exactly that by creating aircraft that will provide the strong defense our fleet needs well into the next century."

The Grumman-Navy contract calls for new aircraft to be delivered starting in 1989.

Media event. *With members of the media recording the event, Grumman Aerospace President George Skurla signs the $1.14-billion contract to upgrade the F-14 and A-6. Also at the ceremonial signing were. Assistant Secretary of the Navy Everett Pyatt (L) and Sen. Alfonse D'Amato (C).*

EW tour. *Maj. Gen. Thomas Swalm, commander of Tactical Air Warfare Center (TAWC), Eglin AFB, recently visited Grumman's Calverton facility. Above, Maj. Gen. Swalm (C) checks out the EF-111A line in Pl. 6 with Al Weidig, EF-111A project manager for CTO; and Lt. Col. Tom Milligan, Air Force representative for the EF-111A at Grumman. Below, the general receives a plaque in appreciation of TAWC's support in the filming of a Grumman EF-111A movie. Presenting plaque were Jack Ingold, director of Electronic Warfare-Marketing; and Lou Raganella (R), GAC site manager at Eglin AFB.*

Changes made in procurement

The following organizational changes have been made in Corporate Procurement Operations:

Lewis Scheuer, deputy director, CPO; John Monahan, special assistant to the vice president, CPO; Gary Scholl, director of Program Procurement including Advanced Procurement; Richard Maniscalco, director of Central Procurement; David Craig, director of Procurement Systems/Policies; Francis Purstell, director of Procurement Planning and Control; and Frank Sorrentino, manager of Small/Minority Business and Personnel Administration.

Donald Canale and Louis Corrao will continue in their present assignments as assistant to the vice president, CPO; and director of Finance and Planning, respectively.

All these Grummanites report directly to Bob Simon, vice president-Corporate Procurement Operations.

Personals

I wish to express my sincere thanks and appreciation to my friends and co-workers for their kind expressions of sympathy during the recent loss of my wife Pat. John K. Vaughan

My family and I wish to express our sincere thanks and appreciation to my friends and co-workers for their kind expressions of sympathy during the recent loss of my son. Bob Lehner

Retiree obituaries

Louis V. Bartik of 1250 Sycamore Ave., Bohemia, died August 5, 1984. He retired in 1973.

Burton H. Patterson of 187 Old Wilmot Rd., Scarsdale, died August 6, 1984. He retired in 1962.

Victor DeMeo of 1029 Calle Grande, Ormond Beach, FL, died August 3, 1984. He retired in 1977.

Paving way for new road network

Grumman's Bethpage facilities have seen a lot of road construction this summer. And while the situation may have caused some traffic jams and headaches, now that the worst is over, most Grummanites would probably agree that the end product was worth the trouble.

Almost complete is a newly repaved and rerouted "South Road" — that's the one going from South Oyster Bay Road next to Plant 15 out to Stewart Avenue between Plant 30 and the Bethpage Community Park. Rerouting this road enabled Grumman's Facilities Department to reclaim several unused drainage sumps, totalling five acres of land.

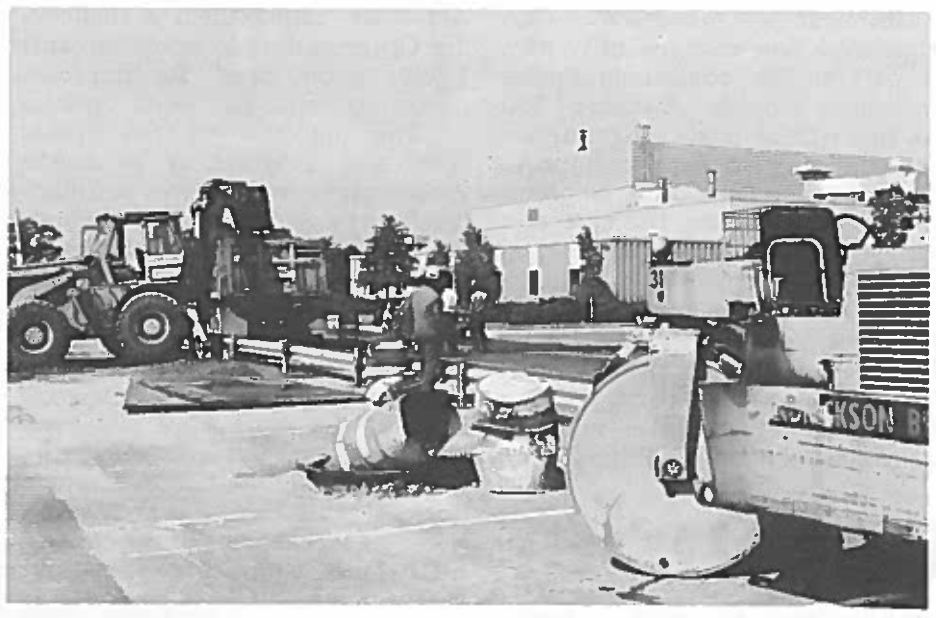
The land was put to much better use — parking for the beleaguered inhabitants of Plant 14. The new lot adds several hundred new spaces, "double the capacity of the old parking lot," says Dale Kant, group leader for the Site Group in the Civil section of Facilities Engineering. Soon to come will be another expanded lot — this one at Plant 26.

Ways to go

Notice anything different about the way you travel to and from the Plant 15 lot? There's a new entrance, but you probably didn't know that it will eventually become a new "West Road." All that will be completed this year will be the entrance to Plant 15 and drainage and fire-sprinkler lines to the headquarters building. Eventually the West Road will run about three-quarters of the way up to the headquarters building, ending at another new road: the "North Road."

This road will follow approximately the same path as the present construction workers' driveway, which connects headquarters with South Oyster Bay Road. Work on the North and West Roads will begin in 1985.

A Grumman boulevard, complete with a center mall, is in the works, too. This will be a widened version of the road that runs out to the headquarters gate. Initial construction will focus on a small section of the road at its opposite end, between plants 14 and 26. This new boulevard section will be finished by the year's end.

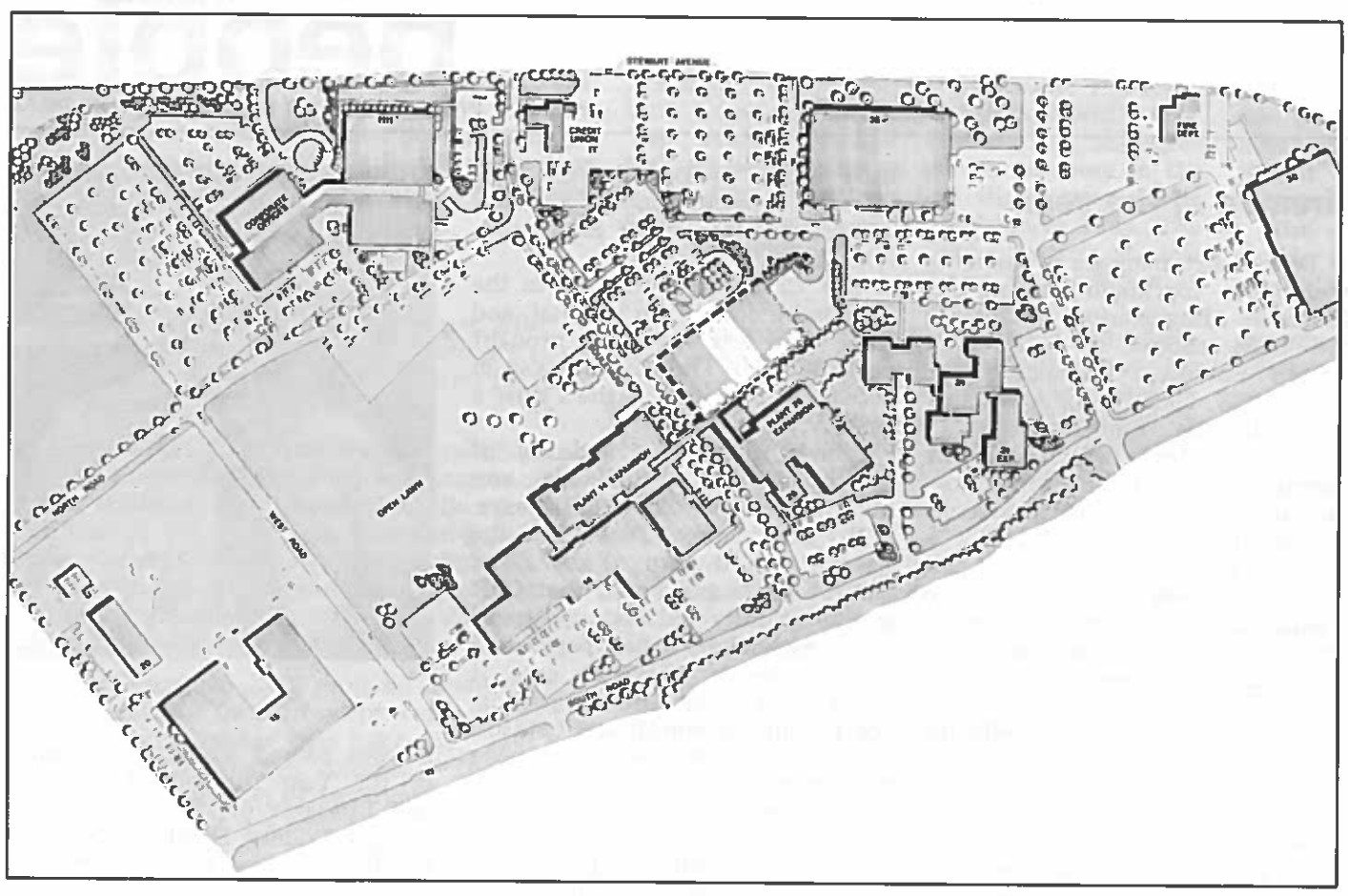


Men at work. *Above, a crew begins work on road outside Plant 31. At far left is the new section of boulevard between Plants 14 and 26.*

Set to commence in the near future will be construction on the new heat treat facility in Plant 3. This will require much of the parking lot there to be closed. However, due to the consolidation of the nearby salvage yard, a new lot will be built there to take up the slack.

Among some of the smaller projects included in this effort, the road (dubbed the East Road) that runs past Plants 35 and 30 to the South Road will be "bent" to make room for an addition to Plant 31.

Along with all the new roads and parking lots has been the installation of new stormwater drainage systems. All in all, the project represents an expenditure of about $2 million. It's all being done in accordance with a master plan, which maps out where new buildings and other facilities will be located when they are constructed far in the future.



Masterful planning. *This map shows the North Complex facilities as they will appear by yearend 1985. By that time, the new West and North Roads will be complete. The dotted-line box at the center of the map denotes the location of the planned Technical Center, which is still on the drawing boards.*

obituaries

ROBERT ROMANELLI JR. of Measurement Standards Laboratory, Plant 12, died July 26 at the age of 67. He had been with the company since 1965 and resided at 6 Target La., Levittown.

NORMAN W. DAUBERT of Procurement, Plant 66, died August 4 at the age of 66. He had been with the company since 1963 and resided at 160 Pearl Drive, Milledgeville, GA.

EDWARD ANDREWS of Production Supervision, Plant 2, died August 6 at the age of 58. He had been with the company since 1945 and resided at 24 Northern Parkway, Plainview.

JOHN MCCARDLE of A-6/EA-6B System Installation, Plant 6, died August 18 at the age of 65. He had been with the company since 1962 and resided at Box 574 Booker La., Westhampton.

Seek winning ways to improve spares prices

Grumman Aerospace has launched a new cash incentive plan as part of its continuing Spares Awareness Program. Awards of $50 tax free will be made to Grummanites who suggest ways to improve the spares system, with emphasis on always providing the customer with both cost effectiveness and fair prices.

The incentive plan initially targets spares priced at or under $2,000 — a category encompassing 170,000 individual parts ordered each year, with a sales value of approximately $15 million. And Aerospace management is challenging Grummanites to come up with 1,000 "good ideas" for improvement to specific parts prices.

"The objective of the Spares Awareness Program is to locate those spares with price peculiarities," says Senior Vice President-Business and Resource Management Bob Myers. "Offering a financial incentive to employees is one way to motivate creativity in this regard and prevent the 'mispriced spare.' "

So-called mispriced spares have been in the news since last year, when the media uncovered the now-famous $400 hammer and a host of other items. At face value, it did seem that some prices charged by defense contractors for spares were abnormally high. But, Myers notes, what the media fail to point out is that the Defense Department has traditionally procured spares in small quantities — an inefficient business practice. Tooling, setup, and labor charges are only spread over an order of, say, five items, rather than thousands or more. This results in a much higher unit cost.

Additionally, contractors such as Grumman must be able to support earlier configurations of their products. Relatively few such spare parts get ordered at any given time.

"We need to stress that there has been no overpricing of spares at Grumman," Myers says. "Our overall spares profit margins are reasonable. But we do have peculiar prices on some of the lower-cost items that we sell."

Notes Vice President-Integrated Logistics Support Harry Kline, whose department will chair the Review Board that will administer the incentive plan: "Grumman has a very good record of fair pricing so far. We want to keep it that way. This program makes sure it's known that we're doing our part."

The Spares Awareness Program was actually begun last November. Jake Bussolini, director of Business Operations, and Roland Olsewski, director of Supply Operations, addressed people in all Grumman departments charged with ordering, estimating, pricing and negotiating spares. They stressed the need for teamwork in preventing price peculiarities. Out of this effort, about 50 employee suggestions have been received.

Myers says about three to four hundred people work in spares-related areas at Grumman, and he feels the incentive program will be highly successful.

"One of the best ways to communicate management's intent is to give people money as an incentive," he notes. "It's one thing to provide lip service. But when you provide money as an incentive, you really get their attention."

Any non-supervisory employee can make a suggestion by submitting a suggestion form, available from Supply Operations. All suggestions will be evaluated by the Spares Awareness Review Board, which consists of people from Resources, Contracts, Corporate Estimating, and Supply Operations.

Winning suggestions must identify not only a problem, but its potential solution. The criteria for a reasonable price will include the intrinsic value and/or a comparable item's value, whether fabricated or procured by Grumman.

When the spare part price does not appear reasonable based on these criteria, Grumman will review the cost elements, delivery schedule, and quantity ordered. If after examining the cost data it is determined that the price cannot be revised downward, Grumman will advise its customers of the pricing peculiarity — suggesting either that the customer increase its order quantity or go to another source.

For application forms, contact Peter Morley at Supply Operations, Ext. (111) 55178, mailstop B06-030.

calendar

ASHRAE: Tues., September 11, Linden Tree, Hicksille, 6 p.m. Guests welcome. Abe Rubenstein, Ext. 52091.

GACE Flying Club: Mon., September 17, BOCES Bldg., Hicksville, 5:15 p.m. Monthly membership meeting. Bob Schulte, Ext. 50682.

Grumman Disabled American Veterans Association: Wed., September 19, Plant 3 cafeteria, 4 p.m. All disabled American veterans welcome. O. Lewis, Ext. 54476.

Grumman Motorcycle Club: Wed., September 19, Recreation Bldg., 5:30 p.m. Rides: Sunday, September 16, Rhinebeck Aerodome, meet at Plant 18, 7:30 a.m. and Sat., September 22, Gillette Castle and Trolley Museum, meet at Plant 18, 7 a.m. Guests welcome. J. Mehnert, Ext. 56163.

Grumman Ski Club: Tues., September 11, McKeons Delicatessen, Hicksville, 8:30 p.m. Guests welcome. Art Garmendia, Ext. 57819/58910.

Society of Manufacturing Engineers: Mon., September 17, Fairchild Republic Co., Farmingdale, 7:30 p.m. Guest speaker will be Walter Harris, manufacturing supervisor. Technical presentation will be "Analytical Industrial Measuring Systems (AIMS) Real-Time Digital Theodolites". Guests welcome. Vince Pavlik, Ext. 55255.

retirees

On behalf of our fellow workers, PLANE NEWS salutes the following men and women for their contributions to the company and wishes them well in their retirement. Those who have recently retired are:

John V. Sirvis, Isiah Skinner, Vincent J. Slama, John Slovak, Rudolph J. Smatlak, Andrew J. Smith, Arthur P. Smith, Arthur Q. Smith, Edgar L. Smith, Elizabeth A. Smith, Francis L. Smith, George Smith, Robert O. Smith, Wilfred R. Smith, Edward J. Smyth Jr., Raymond L. Snedecor, William G. Snyder, Penyamin Sohikian, Elinor R. Soper, Raymond W. Speck, Homer W. Spence, Salvatore Spinella, Arthur Spooner, George N. Sprague, John W. Squier, John Stadnicki, Edward Stange, Mildred Staniewicz, Roy W. Stephenson, Christopher Stiefvater, Gregory Stilwagen, Mary A. Stilwell, Richard Stinson Jr., Ralph C. Straub, Harry W. Strembel, Warren Strittmatter, James J. Sullivan, Philip J. Sullivan, Raymond P. Sullivan, William Suppa, Henry B. Suydam, Lillian A. Swan, Walter A. Swanson, Ernest Takats.

people

Fireman of the year

Dick Gehrt, manager of assembly technology for Manufacturing and Materials Engineering, Plant 2, has been chosen as New York State's Volunteer Fireman of the Year 1983. Dick, a volunteer fireman in the Smithtown (L.I.) Fire Department, will receive the award August 23 during the convention of the Firemen's Association of the State of New York.

Each year, the association presents the award to a fireman who performed a heroic act during the previous calendar year. Dick's act of heroism occurred on June 23, 1983.

On that day, Dick was relaxing in his backyard, under doctor's orders. He had undergone a four-way heart bypass operation just four weeks earlier.

An 18-month-old neighbor, Katie Jean Kondenar, fell into her family's swimming pool, next door to Dick's house. Katie's mother pulled her lifeless body from the pool, then Dick performed cardiopulmonary resuscitation (CPR) until relieved by two other Smithtown firefighters.

The CPR was continued in the ambulance and at the hospital, and Katie Jean was eventually brought back to life. Though she was in a coma for 36 hours, she's now a healthy, normal child.

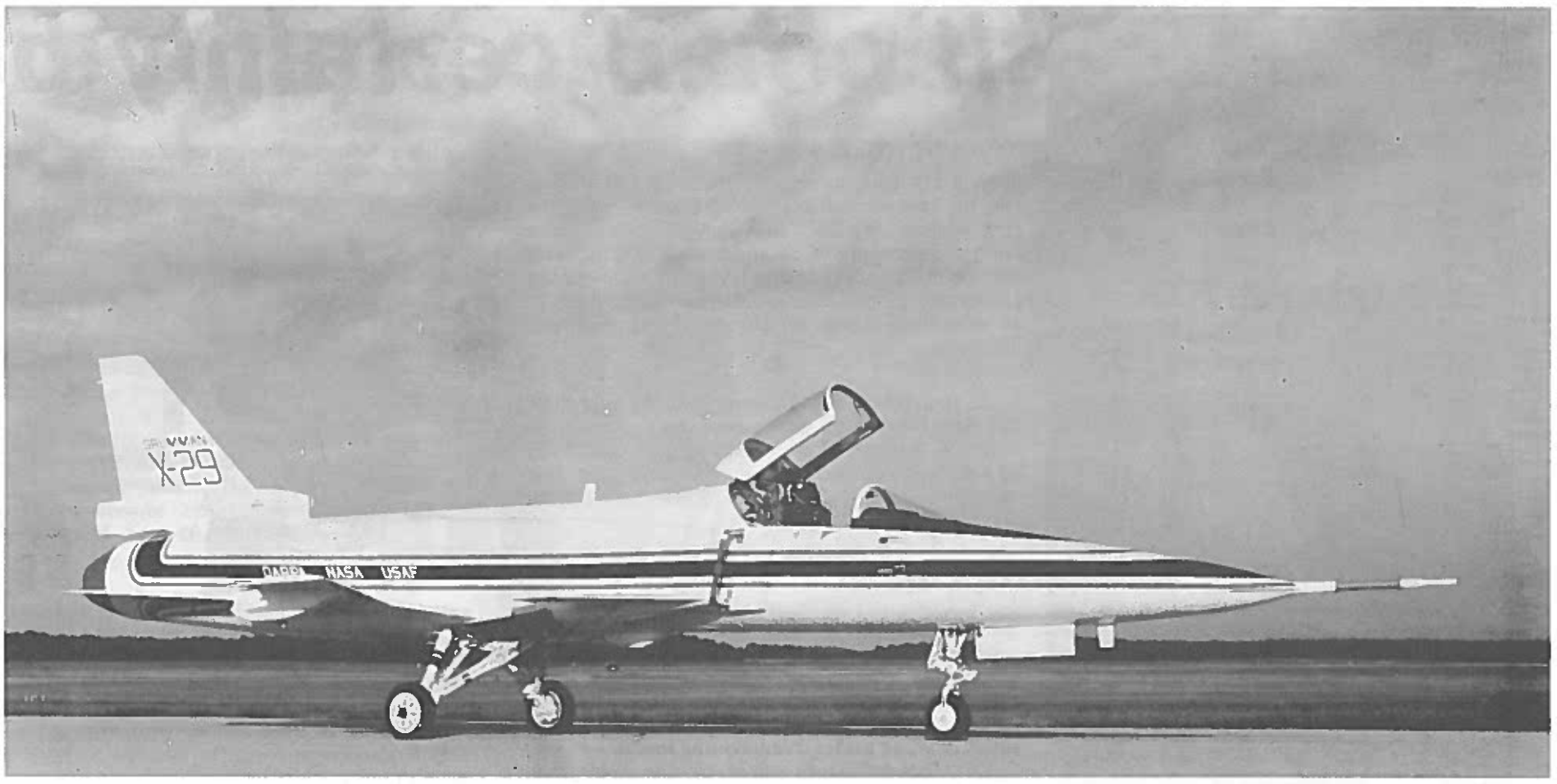
"She's running in and out of the house, raising hell like any other three-year-old," Dick says.

In nominating Dick for the Award, Smithtown Fire Chief Robert Luttmann noted that CPR is a physically exhausting experience, particularly when performed by one person. In Dick's case, it could have been life-threatening, considering his convalescent status.

Dick knew his name had been submitted for the award, so he wasn't completely surprised when he won. He's modest about the experience. "This is the biggest award in the state, and it's a real honor," he says.

In addition to the state award, Dick got some local recognition — he was named Volunteer Fireman of the Year for Suffolk County, and Lifesaver of the Year by the Suffolk County Heart Association. He also received an award from a New York State emergency medical technicians' association and one of *Firehouse* magazine's annual heroism awards.

Dick Gehrt



X marks a pistol-hot design

BETHPAGE, N.Y. — Given a quick glimpse of the X-29 in its hangar, one's first reaction is: it can't possibly fly. The wings, for instance, are attached near the back end, poking forward. And, out front, there's a pair of funny little fins called canards mounted where the wings ought to be. Odd is the best way to describe Grumman Aerospace Corp.'s new X-29 airplane. (Boston Globe, December 5, 1983)

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The X-29 certainly is a show-stopper. After all, it is the United States' first new X-series plane in more than a decade — not to mention that it is also Grumman's first X-plane.

Most of the Government-sponsored X-planes were unique — usually built to investigate one or two specific aeronautical advances. But the X-29 is different. While its main attention-getter is its forward-swept wings, the X-29 is a demonstrator of several key advanced technologies that will produce a wealth of flight-research data applicable to future fighter concepts.

"The Grumman X-29 program is built around its characteristic forward-swept wing — a technological advance whose time has come," says Bob Roemer, X-29 program director. "The unique shape solves a number of aerodynamic problems, but the net result is a smaller, lighter, and more agile aircraft that will burn less fuel on a typical fighter mission.

"These highly desirable results will be achieved by taking full advantage of the benefits of forward sweep, only now possible because of recent advances in aerodynamics, structural design and materials, and computer-aided control systems," adds Roemer.

Forward-swept wings are not new. The Nazis built a four-engine bomber during World War II. The Junkers Ju-287 featured a 15-degree forward-swept wing to gain more room in the bomb bay. Seventeen test flights were made before its capture by the Allieds in 1944. The Junkers demonstrated good control at low speeds, but revealed a potential high-speed problem known as structural divergence.

"Divergence is very similar to what you experience when you stick your hand out of your car window at 60 mph," explains Glenn Spacht, deputy program director. "If your hand is slightly tilted upwards, the wind pushes your arm back. Try that at 300 mph and your entire arm would be ripped off."

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After wind tunnel tests on a model wing verified the conclusions of his research paper, Dr. Krone pushed for production of a working plane.

He remembers that it was not easy to persuade others to take his ideas seriously. "At cocktail parties, they would say I was in the sun too long," he said in a recent telephone interview. "That my curlers were too tight."

He endured the ridicule, however, and eventually won government funding for the project. (Sun, Baltimore, Md., July 25, 1984)

As an aircraft equipped with forward-swept wings goes faster, wing loading and bending increases and taken to extremes, the wing would be ripped off the fuselage. Conventional aircraft with aft-swept wings are not subject to such forces.

Today's X-29 originates from tailored composite structural concepts developed in the early Seventies by the Flight Dynamics Laboratory, Wright Aeronautical Laboratories, Wright-Patterson AFB, Ohio.

The concept was applied by Air Force Col. Norris Krone (now retired), who published a master's thesis entitled, "Divergence Elimination with Advanced Composites" in 1975. This work described the key to overcoming forward sweep's basic problem of structural instability. Krone's thesis held that the directional properties of carbon-fiber laminates could be used to control the twisting of the wing. The development of advanced composite materials propelled the forward-swept wing concept from drawing board to hardware development.

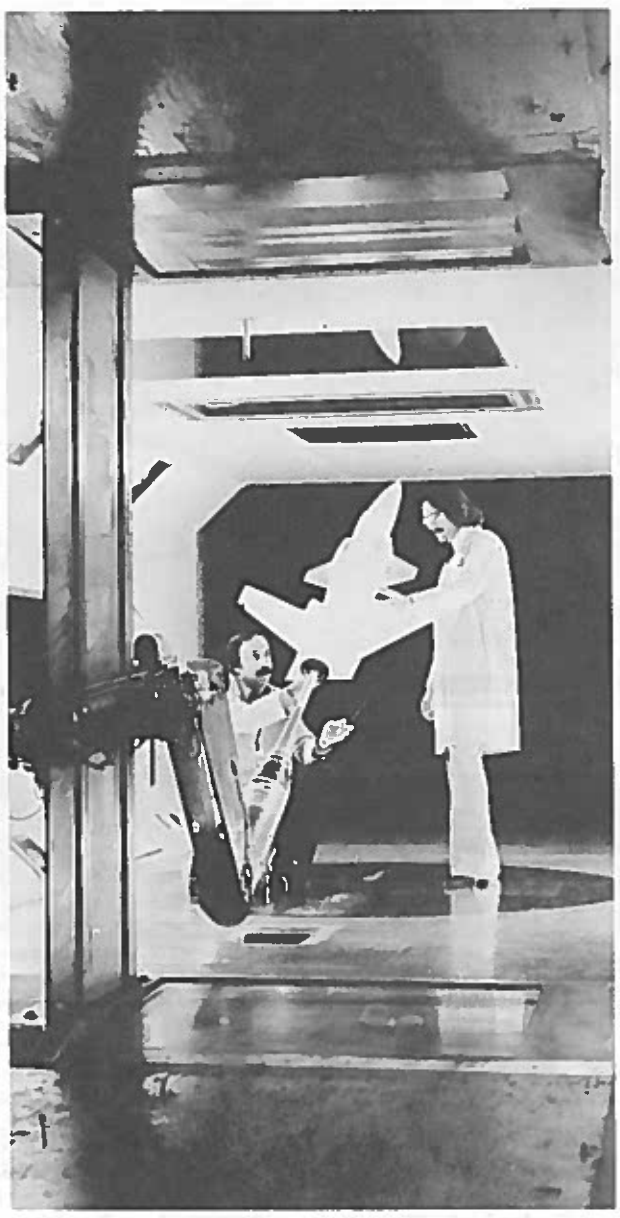
Intensive investigations and technology validation studies to develop a viable forward-swept-wing supersonic aircraft have been underway at Grumman since 1976. The X-29 program began officially in December 1981 when DARPA awarded Grumman a contract to build two X-29 technology demonstrators.

Grumman has extensive experience with composites having used them for external structural parts on the F-14 and for numerous applications on military and commercial airplanes.

Production of fiber-reinforced plastic materials known as composites has matured over the last

(Continued on page 8)

'It could certainly be



Windy. *In 1979, Grummanites Bert Thompson (L) and Roy Charlette prepare a forward-swept wing model for wind tunnel testing.*

(Continued from page 7)

decade resulting in strong, lightweight materials for aircraft structures. A structure made of composites weighs substantially less than ammetal structure of comparative strength. Parts are made by building up layers of resin-coated composite fabrics over molds and curing them in an auto clave at high temperatures and pressures.

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At Grumman, Bob Roemer said the new X-29 has been likened by some observers to "an arrow with its feathers at the front and its weight at the back," and noted that the design at first "caused a lot of guffaws." (Boston Globe, December 5, 1983)

●

Because composites are stiff in only one direction, a structure can be tailored to bend in a specific direction under aerodynamic loads. This is achieved by criss-crossing the material in a predetermined pattern during fabrication. The wing of an aircraft can be "aeroelastically tailored" to resist twisting under manuevering loads.

The forward-swept wings on the X-29 challenged Grumman designers to use this new structural approach. This led to composite wing covers that resist the tendency toward structural divergence.

●

"It's an internal education and an external demonstration that we're viable competition," Mr. (Glenn) Spacht said. "It's forced our people into a new way of thinking. It blew the cobwebs out of everybody's mind." (Herald International Tribune, June 2-3, 1984)

In the still of the night *Only a few dozen Grummanites were on hand to witness the dead-of-night transfer of the X-29 from the Product Development Operations Center assembly hangar into the neighboring static test hangar on October 28, 1983.*

X-29 gets a 'shake-up.' *From November 1983 to January 1984, the X-29 underwent intensive static testing — six days a week, 24 hours a day, in Plant 5.*

The X-29's front spar and root ribs are made of electron-beam welded titanium. The remainder of the wing substructure is aluminum. The cover is a graphite epoxy composite fabricated in one piece — 27 feet from left to right wing tip. Each wing cover weighs 289 pounds. Because it is stronger than steel, the graphite composites give the aircraft the strength to resist tremendous aerodynamic forces.

Another distinctive feature of the X-29 is the little wings to the aft of the cockpit. They are called canards (french for duck) because of their supposed resemblance to flying ducks whose stretched wings appear to be far back on their bodies.

●

Like so much else about the planes called X-29s, their design borrows from the past — all the way back to the Wright brothers. Yet it shatters barriers that have limited aeronautical architecture for decades. Indeed, the X-29 is intended to feint and dodge — fight — at supersonic speeds and fly farther and faster for any given engine thrust than any current aircraft.

"This is Star Wars in terms of what we're flying today," said Glenn Spacht, the project's deputy director. (New York Times, May 30, 1984)

●

Canards are not new. They are as old as powered flight itself. Wilbur and Orville Wright's 1903 Flyer featured a canard for controlling pitch mounted in the front of the pilot rather than at the tail. Even though the U.S., Japan and Italy experimented with canard-equipped fighter planes during WWII, none proved stable or reliable enough to go into production. The advent of computer-aided engineering has sparked new interest in canards.

By being placed close to and in the same plane

A unified effort

The X-29 represents a unified commitment to future aircraft development by the Defense Advanced Research Projects Agency (DARPA), the U.S. Air Force, the National Aeronautics and Space Administration (NASA) and Grumman. Over 100 other aerospace firms are also played a role as subcontractor on the X-29 program.

The $87-million X-29 program is sponsored by DARPA, a special agency within the U.S. Department of Defense chartered to develop high-risk technologies with potentially high benefits. In addition to DARPA's $87-million, Grumman has also invested $40-million of its own funds in the X-29.

The flight demonstrator program is administered by the U.S.A.F. Air Force's Flight Dynamics Laboratory at Wright-Patterson Air Force Base in Ohio. Flight testing will be carried out by NASA's Ames Dryden Flight Research Facility on Edwards Air Force Base, California.

the shape of things to come'

as the wing, the X-29 canards channel air flow over the inboard wing area to resist root stall. Each canard has an area that is 20 percent of the wing area. Fully articulated, the leading edge of the canards can move from 30 degrees up to 60 degrees down as the aerodynamic loads dictate.

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Convincing the skeptics that a high-performance forward-swept-wing aircraft will fly is the primary justification for building the Grumman X-29. But there is more to this aircraft than its unusual wing, and the principal benefit of the programme is likely to arise from its integration, for the first time in a single airframe, of several other technologies. (Flight International, June 16, 1984)

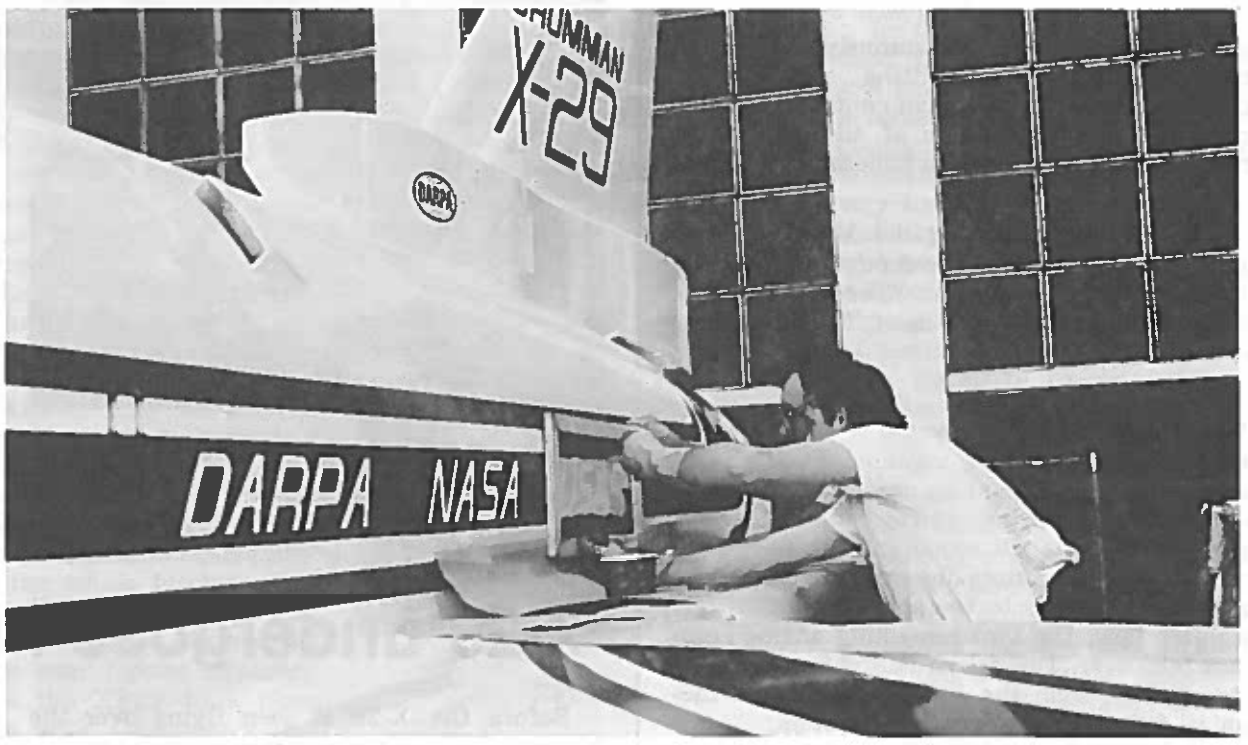
●

Among the other aerodynamic concepts being exploited with the X-29 are:

Variable camber. While its thin wing provides excellent transonic performance and maneuverability, there is too much camber (engineer's term for curvature) at the back of the wing for the X-29 to achieve efficient supersonic flight. Therefore, a two-segment variable camber device is installed on the trailing edge of the wing. This allows the curvature of the wing to be changed in flight to create the best combination of lift and drag for cruise, maneuvering, takeoff, and landing. In addition to varying the camber of the wing, the camber device on the X-29 moves up and down to act as flaps and asymmetrically to act as ailerons.

Strake flaps. Strakes are the horizontal surfaces that extend along either side of the engine exhaust nozzle on the X-29. Thirty-inch-long flaps on the trailing edge of the strakes assist the canards for pitch control.

Moving ahead. *Bob Perniciaro works on one of two large display models of the X-29 in the Plant 5 Model Shop in mid-August 1981.*



The finishing touches. *The week before the August 27th roll-out ceremony, the X-29 gets its patriotic paint job -- red, white and blue -- at the Calverton Paint Shop.*

Three-surface pitch control. The X-29 uses a three-control-surface configuration for pitch control. The canards, flaperons, and strake flaps are driven in concert to minimize drag. This maximize's the aircraft's responsiveness at the onset of maneuvers by increasing pitch acceleration.

Relaxed static stability. Stability is the tendency of conventionally configured aircraft to return to straight and level flight after a movement of the controls. It does increase a plane's drag, though. The X-29 is 35 percent unstable at subsonic speeds. This inherent instability is called relaxed static stability. Using a design with relaxed static stability reduces drag, but makes the aircraft difficult to control since it must constantly be returned to straight and level flight.

●

The canard/wing combination bears most of the burden of stabilizing the aircraft during subsonic flight. Stability on the X-29A can be achieved only on a fly-by-wire basis, since no human being is able to fly manually an inherently unstable plane. (National Defense, July/August 1984)

●

Advanced flight control system (FCS). To control an aircraft designed with relaxed static stability, the FCS must provide an artificial stability. On the X-29, this is achieved with a fly-by-wire flight control system. The system is a three-channel Honeywell digital flight control system with an analog backup.

Fly-by-wire enables the control surfaces of an aircraft to be operated by electronic command. Mechanical controls such as cables or pushrods on more conventional aircraft are replaced by computers, wires, and sensors. In maneuvering the X-29 , the pilots move the stick, which sends a command to the flight control computer. The computer calculates the control surface movements needed and sends a command to the actuator to move the control surfaces.

To maintain stability on the X-29, sensors assess flight condititions including altitude, speed, and attitude and feed data to the flight

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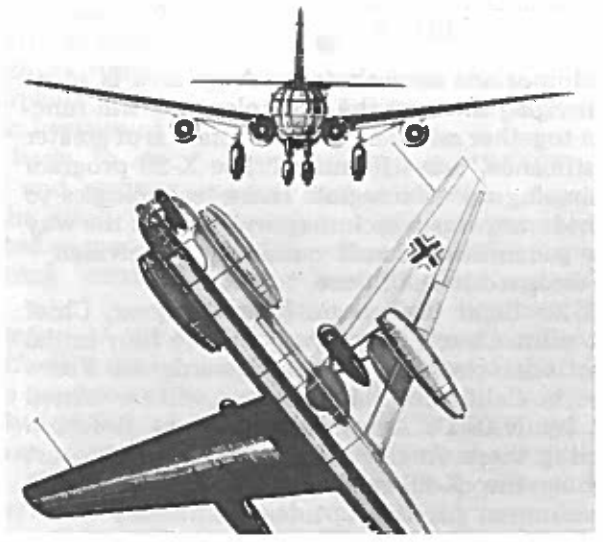

Historical note. *Forward-swept wings are not new. The German Junkers Ju-287 with its 15-degree forward swept wings premiered during WWII (above). The same German engineers designed another forward-swept-wing aircraft in the Sixties -- a Hansa business jet. Fifty were produced, but their metal wings showed serious structural problems within the designated flight envelope.*

Forward to excellence

(Continued from page 9)

computer. It, in turn, continuously adjusts the control surfaces, transmitting up to 40 commands a second. The flight control computer coordinates the movements of all the control surfaces so that they work in concert.

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Spacht is confident that the X-29 will be a major advance. "It could certainly be the shape of things to come," he says. "The X-29 is really a national technology asset." (Newsweek, December 5, 1983)

●

The FCS is triple redundant — that is, three control systems working together. Each system consists of a digital and an analog computer as well as their respective power supplies. If one digital system fails, the remaining two take over. If two digital computers disagree, the flight control system switches to the analog mode. If one computer fails, the two remaining analog computers take over. The risk of failure in the X-29's system is less than the risk of incurring a mechanical failure in a conventional system.

Using digital technology for flight control is relatively new. In a digital system, baseline data is programmed into the software. This makes a digital system easier to modify than its analog counterpart, which would require hardware modifications.

●

If the X-29 program can show that a high-performance tactical aircraft can be lighter and smaller, the next generation of fighters should be cheaper to procure and operate. With procurement and operating costs directly related to an aircraft's size, the Air Force and Navy may get more aircraft for the dollar than ever before. (National Defense, July/August 1984)

●

"Important as each technology area is in its own right, the way the X-29 elements will function together as an integrated system is of greater significance," says Roemer. "The X-29 program is shaping up to integrate these technologies to provide answers which may well change the way new generation aircraft — military and civilian — are designed in the future."

X-29 flight tests begin later this year. Chief test pilot Chuck Sewell will fly the four initial functional check flights at Edwards Air Force Base in California. Flight testing will be carried out by NASA's Ames Dryden Flight Research Facility there. At the completion of Sewell's test flights, the X-29 will be transferred to the Government for concept demonstration.

●

Veteran Grumman test pilot Chuck Sewell, who will be the first to fly the X-29, is confident that the plane will perform as designed. But any design as radically new as this one carries some risk, and Grumman officials will be holding their breath on the big day. "If I could sell tickets to people who want to watch that flight," says (Glenn) *Spacht, "I'd be a rich man.* (Discover magazine, March 1984)

Sneak preview. *Grumman test pilot Tom Gwynne gets a visual rendition of what it's like to fly the X-29 using the Motion Based simulator in Plant 14 earlier this year.*

Testing it out. *Orlando Vescio and Mark Rausch (R) monitor hydraulic pressures of the X-29 actuators and other components using the X-29 Hydraulic Test Stand.*

X-29 undergoes multitude of tests

Before the X-29 is seen flying over the Mohave Desert in California, it will have already passed a myriad of tests.

First, there were the wind tunnel tests early in the program. The use of computer models and analyses reduced wind-tunnel testing on the X-29 by about 10 percent compared to other new aircraft.

A radio-controlled scale model built and flown in 1977 verified the computer codes. As the X-29 program progresses, a 1/8-scale wind-tunnel model was tested subsonically, transonically, and supersonically at angles of attack as high as 90 degrees. A one-half-scale structural wing model was also tested in the 16-foot transonic dynamic tunnel at NASA's Langley Research Center.

During the development phase of the X-29, various structural tests were conducted to evaluate materials and structural combinations. Full-scale structural tests were conducted in Plant 5 earlier this year. The X-29 was locked into a test fixture and simulated aerodynamic loads were imposed on the airframe, wings, and control surfaces using hydraulic jacks. The X-29 met or exceeded all structural and proof-loading requirements.

Systems tests were also conducted on the plane itself and on a laboratory model housed in Plant 14. The entire digital and analog X-29 flight control system underwent extensive laboratory testing. Simulators allowed pilots to experience realistic flight conditions. A hybrid simulation computer used a mathematical model of the X-29's flight characteristics to operate the laboratory's flight control system. Intensive testing was conducted using multiple failures, severe maneuvers, and flight outside the design envelope.

Another systems development tool was the total in-flight simulator. At Calverton Operations, full X-29 flight controls were fitted in a separate cockpit extending from the nose of an Air Force C-131B aircraft. Using this simulator, pilots were able to experience hands-on control responses using the fly-by-wire flight control systems with varying software modifications.

In other ground tests at Calverton, hydraulic pressures of the X-29's actuators and other components were monitored by the X-29 hydraulic test stand. Final acceptance ground tests will be performed on the aircraft itself to evaluate the flight control, hydraulic, electrical, fuel, and environmental control systems.

During the actual flight tests themselves, Grummanites at the Automated Telemetry System (ATS) building at Calverton will be in touch with the X-29's test pilot.

While a pilot is flying the X-29, flight data are transmitted to a ground station via a telemetry link. Using the automated telemetry system, constant communication and coordination is maintained between the aircraft and the ground. Temperatures in various sections of the plane, structural loads, wing pressures, bank angles, roll rates, and vibration are all recorded instantaneously to ground-based test engineers.

Information is displayed on terminals, while other computers feed data on graph paper, translating electronic transmissions into readable engineering information. Pilots and flight test engineers can react and address problems as they arise, adjusting the flight regime to achieve maximum performance and safety.

The most recent advancement allows flight test data to be transmitted from NASA's ATS via satellite transmission to Grumman's Calverton ATS station. Using an F-14 test aircraft as a host vehicle, in-flight information was transmitted this past spring 22,300 miles via satellite from NASA's Dryden site to Calverton. The elapsed time between transmission and computer display was 1/4-second.

Off-site, satellite-assisted ATS provides instantaneous readouts for interested parties on both coasts of the United States.

Company learned a lot from its X-planes

Even though the X-29 is Grumman's first X-plane for the United States government, the company has a long history of its own experimental airplanes, each with a Grumman "X" designation.

"The major difference between the Grumman 'X' and the U.S. government's X-plane series is the end result sought," says Larry Mead, a senior management consultant and technical assistant to the Grumman Aeropsace president. Mead has worked on a number of Grumman X-plane designs and is currently acting as chairman of the preliminary flight readiness review team for the X-29.

"In the government program — and specifically with the X-29 — the knowledge gained through the entire project will be disseminated throughout the aircraft industry for application to future aircraft.

XFF-1

"The main idea is to demonstrate new technology of experimental design features for aircraft development in general," adds Mead, who retired as a senior vice president-Technical Operations in 1983.

In virtually every case, the Grumman X-designation denotes a prototype aircraft design specifically created in hopes of becoming a production airplane. "One that we can make and sell," explains Mead.

Thus a majority of Grumman aircraft — from the first FF-1 made in the early 1930s to today's F-14 — had an X-designated predecessor. Many of the experimental Grumman X-planes went on to become production aircraft. Others did not, though often technology displayed in these tests found its way into later production models.

Grumman's original X model, the XFF-1, was an airplane of many firsts. The prototype of the FF-1 dubbed "FiFi", represented the very first airplane built by the fledgling Grumman Aircraft Engineering Corporation. The XFF-1 boasted 20 miles per hour greater speed than any other fighter of its time, and it was the first Navy or Army plane to exceed 200 miles per hour.

Construction on the XFF-1 began in Grumman's original plant in Baldwin. As the company's business expanded, a move was made to a new site in Valley Stream where fuselage and wings were trucked for final assembly. The XFF-1 took its maiden flight on December 29, 1931 and when successfully completed the company took a collective sigh of relieve. (Some minor modifications had to be made when the airplane's landing gear developed a disconcerting habit of folding up when it hit a bad bump.)

Two other aircraft were adapted from the knowledge gained in the XFF-1 program. The XF2F was a single-seat fighter version of the two-seat XFF-1, and offered the first use of the twin-row Pratt & Whitney radial engine in a fighter. The use of the P&W engine enabled the frontal area of the airplane's cowling to be streamlined into the profile of the whole fuselage. This created the "teardrop" look that was to characterize several of Grumman's later fighter airplanes.

Work on the XF2F took place side-by-side with Grumman's first amphibious aircraft, the XFJ-1, in Farmingdale. The XJF-1 was a result of a mating of an adaptation of the XFF-1 fuselage with Grumman's "B" Model float (one of two aircraft float models that were the company's first products). The retractable landing gear, in the adapted model "B" float gave the XJF-1 the ability to operate from land or water, earning it the name "Duck."

XF2F-1

With the start of World War II, Grumman aircraft really took off. The first experimental fighter to fly out of the new home in Bethpage was the XF4F-2. The first of the Grumman fighter "cat" family, the XF4F-2 would eventually become known as the "Wildcat."

While the Wildcat was carving its name in the history books in the early air battles of WW II, another fighter was being developed by Grumman. The XF6F-1 would come to represent the only fighter plane developed and manufactured during WW II when it went into production as the Grumman "Hellcat."

The Grumman X-series also extended to the design of aircraft for the U.S. Army. In 1941, the XP-50 was developed as a high performance interceptor for the Army Air Corps. It was a peculiar looking airplane that was a land-based suped-up version of an earlier two-engine Navy experimental plane made by Grumman, the XF5F.

Designed during 1928, with Navy

XF5F-1

encouragement, as the first twin engine, carrier based fighter, the XF5F-1 was a startling original concept. It incorporated a slender fuselage mounted on the trailing of a single, long wing that carried two Wright 1,200-horsepower engines. In effect, it looked as though the wing and the engines were pulling the trailing fuselage — as, indeed they were.

While its look was radical to say the least, the XF5F-1's high performance characteristics, including a phenomenal — for the time — 4,000 feet per minute rate of climb, earned it the unofficial name of "Skyrocket." Despite its superior performance, the airplane never made it into production because of a major shortcoming basic to its design. With the wing and engine mounted in front of the pilot, his visibility was very limited — a considerable problem during carrier landings.

The Army Corps version of the airplane, the XP-50, suffered a similar fate when it ran into mechanical problems during an early test flight.

After WW II, Grumman's X-series moved into the jet age. One of the company's first big experimental jet models was designed to sell an aircraft with variable-swept wing — the XF10F Jaguar.

The XF10F Jaguar was a very big fighter, weighing 20,468 pounds empty and well over 35,000 pounds with armament. The first American "swing-wing" aircraft, the Jaguar proved to be a 10-ton package of engineering challenges. The XF10F's first flight, with Grumman test pilot Corky Meyer at the controls, was made in the spring of 1952 at Edwards Air Force Base in California — Bethpage was simply too small for the kind of tests the Jaguar was to undergo.

In the "unswept" configuration used for takeoff, low-speed flight and landing, the plane's flight characteristics were ideal. The swept configuration for high-speed flight, however, produced a number of very tough problems involving both stability and the longitudinal control system. This was aerodynamic pioneering in its most demanding form during the 18-month program of testing and modification, Grumman engineers fought battles for stability and control on half a dozen different fronts.

The Jaguar's problems seemed to compound each other, and when its engines failed to perform up to par, the Navy, who had ordered twelve preproduction models, terminated the whole project. Each of the two prototype Jaguars that Grumman did build, suffered an ignominious end. One was deliberately destroyed in testing a new type of crash barrier. The other, never flown but

XF10F-1

used for static tests and mechanical evaluation, became a target for tank and artillery practice.

Still, although the XF10F never reached the production stage, the experimental project provided information that would find application in several other operational swing-wing aircraft — in the F-111 a decade later; in the American SST concept; and finally in the highly successful Grumman swing-wing Navy fighter, the F-14 Tomcat.

Grumman's current involvement in the government-sponsored X-29 project is something new for the company. But it represents very much the same idea behind Grumman's own X-series airplanes — the search for new technology and new knowledge to be used in future aircraft design and development. Grumman hopes that its involvement with the X-29 will place the company in a leading position when the time comes to choose the next generation of fighter planes.

work

It's one third of your day for probably 45 years of your life. You love it, hate it, can't wait for Mondays, or just live for Fridays. It gives meaning to your life, or maybe it's just a way to keep food in your stomach and clothes on your back.

Whatever work means to you, it's definitely part of the way you define your place in the world.

In the latest in a series of interviews in which Grummanites talk about work, Peter Gregory, a day shift leadman at Great River Operations, talks about his job.

I am celebrating my first year anniversary with Grumman this summer. In fact, because the project I am working on — the Eagle Telephonics telephone system — is relatively new to the company, many of the people in the program are also new. I spend my entire working day in what we call the 'Eagle room' — Great River's automated printed circuit board, or PCB, production line.

Essentially what we do is make PCBs and assemble telephones for the Eagle company. The Eagle job is a commercial contract for a business telephone system. The contract is really the first high-volume production work for Grumman. The line is designed to put out over 1,500 units per day at peak operation.

I started with Grumman as a part-time employee, working three or four days a week on what we call 'wire harness' boards for the F-14 and EF-111 programs. After three and a half months, I was brought on full-time. I was still working primarily on the harness boards, when I started doing some work in what was then just the beginning of the Eagle room. I was eventually dedicated full-time to the Eagle project around the first of this year.

'The job really keeps me on my toes and I like that.'

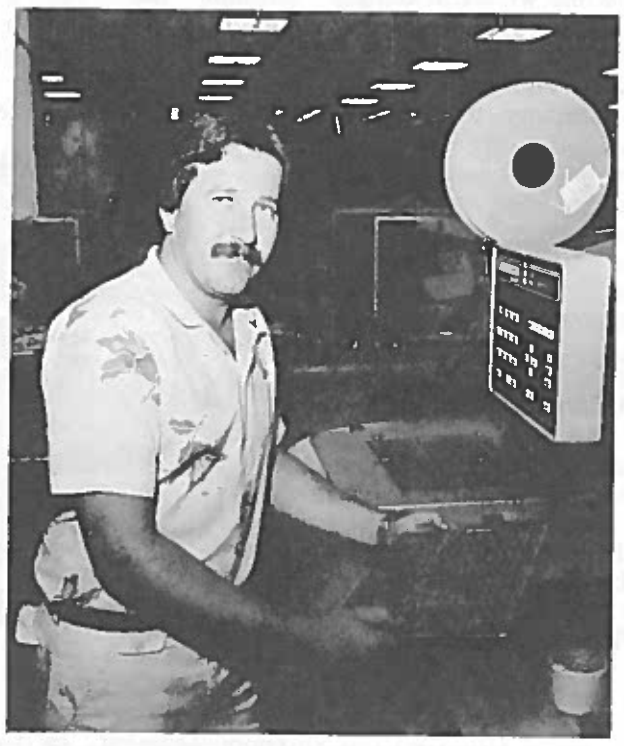
Initially we started out with just a few people on the staff and our responsibilities were pretty widespread. The Eagle room was just getting started then and there was an awful lot of work to do and not too many of us to do it.

It was only recently that we got our titles. As day shift leadman, my main responsibility is to act as the dispatcher at the head of the production line. We have two main computer terminals at the head of the line handling different facets of the production operation, of which I am responsible.

The Hewlett-Packard 3000 is the computer that keeps inventory of all the work on the production line from start to finish for the Eagle project. The computer keeps track of each work station's 'throughput' on the assembly line. It's my job to feed the information regarding the inventory and work going through the line into the computer as we go along.

The second terminal that I work with is the IBM PC — or personal computer. The PC allows me to control the routing of the work totes — the orange tubs that we use to transport PCBs to each of the 78 workstations along the line.

The terminal also keeps track of everything in the carousel — which can carry up to 264 totes or tubs, at a time. Earlier in the program, we had to keep manual inventory records of the work stored in the carousel. That was extremely



Peter Gregory

Great River leadman

tedious work, to say the least, and not as efficient timewise or as accurate as the IBM computer system.

We call the two terminals at the dispatch station the 'brains' of the production line. My job is to use those brains to keep the line running smoothly.

The ironic thing about my handling this computerized system is that I have had limited exposure to computers before this position. I have degrees in history and secondary education, and a New York State teachers certificate to teach social studies at the secondary level. But as for a background in computers, the only time I had been around a computer before was when I was in the Navy.

In fact, when I returned to Long Island after the service — I was born and grew up in the Great River area — I was hesitant to apply at Grumman because I lacked an engineering background. I was encouraged to apply here at Great River by a friend of my family who already worked for Grumman. I guess it's only because of the uniqueness of the Eagle project and the installation of the new PCB line that I was able to come to work here and learn all that I have thus far. It was a great opportunity and it's been a tremendous learning experience for me.

I have previously been in a position of responsibility where I was in charge of a large group of people. As a first lieutenant and division officer in the Navy, I had a deck force of 50 men under me. But that is not quite the same as working with people in a commercial factory environment. There has to be a lot more give-and-take here.

Virtually all of the people that I work with in the Eagle room are new to Grumman and in many cases, new to this type of work. For the most part, everyone here is learning on-the-job.

I was given several manuals and told to learn the computer system. Fortunately, I have been able to pick up the information that I need but there is always more to learn and the only way to do it is hands-on.

Just about all of the operators working in the Eagle room have some interface with computers. Each of the machines on the line is controlled by a computer somewhere along the way and the operators have to deal with computer terminals. Basically, its a matter of knowing which keys to punch. The actual programming of most of the system was left up to Tommy Swenson of Methods who is now the assistant foreman on the Eagle project.

My job does require a bit more knowledge of how the computer system works. As leadman it's my responsibility to be able to 'troubleshoot' whenever a problem arises on the line. There is a special diagnostic code in the IBM to help me with that. When we have a problem

'For the most part, everyone here is learning on the job.'

with the Hewlett-Packard, we usually turn to Systems Analysis and work with them on it.

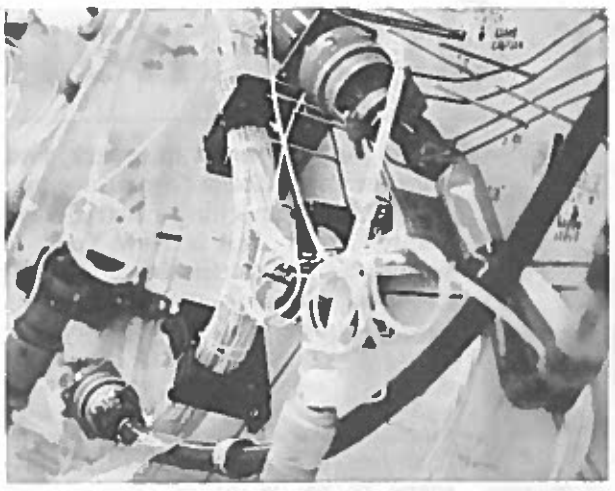
One of the things that really helps me in my job is the flexibility that is built into the system. We also try to learn and work together as a team. The concept of teamwork is something stressed by our foreman George Barhold. George is a very patient and receptive person. He's not easily flustered by the kind of annoying problems that are bound to pop up in a system as new as the Eagle room. He tries to give everyone the opportunity to contribute and that really enhances the efficiency and quality of our work.

I'm currently responsible for about 24 people in the Eagle room. My end of the operation is to take the PCBs through production to the point where they can move off the conveyor line and into the testing and checking stages. The number of people working in the Eagle room will change as the project continues to grow. We are looking to get about 65 people per shift in the room when we have the line at peak production. Only in recent weeks have we brought production up near peak levels and are now working out the bugs we found.

Grumman has been known as an aircraft manufacturer that puts out a relatively low volume of products with extremely high quality. In the Eagle program the contract we have calls for production volumes of 1,300 to 1,500 telephone units per day. It's a totally different type of job that calls for different work disciplines. Sometimes George might ask my opinion on how someone is doing in a certain position or if a person has the potential to be moved to some other area where we may have a need. It's the kind of thing that calls for team input, and that's really what this project is all about — and what makes my job rewarding.

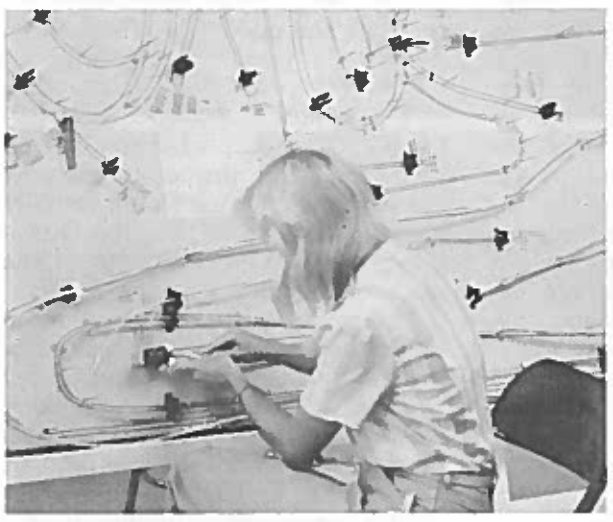
Between the Eagle work and the recent addition of the 'Cosmos' IBM project to the line, I find myself putting in 12-hour days. I just can't find enough hours in the day to accomplish all the things I would like to — but that is part of what keeps the job interesting.

There is a lot of responsibility that has been given to me and I take it as a compliment. The job really keeps me on my toes, and I like that. It's a challenge — that's the best part.



Checking it out. *Carol Tschudi fabricates DIT-MCO cables and aircraft electrical cables for the OV-1D Mohawk.*

Cable vision. *Jerry Goodin works on electrical cable assemblies for both the A-6E and KA-6D.*



The connection. *Sandy Allex performs solder operations and contact crimping procedures on the work bench.*

Intruder contributor. *Betty Green makes electrical panels and cables for the A-6E.*

Wire room harnesses teamwork

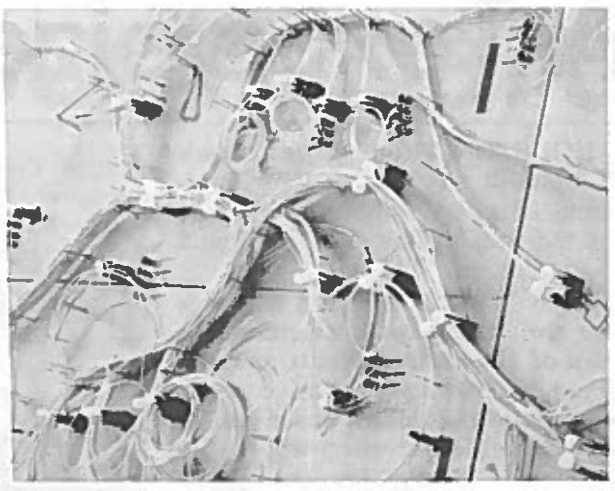
STUART, FLORIDA — Slightly over 75 Grummanites process miles and miles of harnesses, cables and wires for Grumman aircraft every year here. Though the group is scattered throughout the Stuart Operations facility, there is a common bond that ties this crew together — pride in producing the best.

Just about every Grumman plane carries at least a piece of the Stuart wire room's handiwork . . . the F-14 pylons, aft center section and weapon system; the E-2C and C-2 wings; and the A-6 weapons, pylons, and pallets. In addition, the wire room team also supports Stuart-based operations, such as the OV-1 Mohawk, the DC-8 CAMMACORP program, and the Boeing 767.

"We are basically a subcontractor to New York," states Billie Gruwell, Production supervisor. He notes that the wire room's capabilities are very similar to Great River Operations on Long Island — but on a much smaller scale. The Grummanites at Stuart also supply cables and harnesses for their neighbors to the north at Grumman St. Augustine for the A-4 Malaysian program and the KA-6D program.

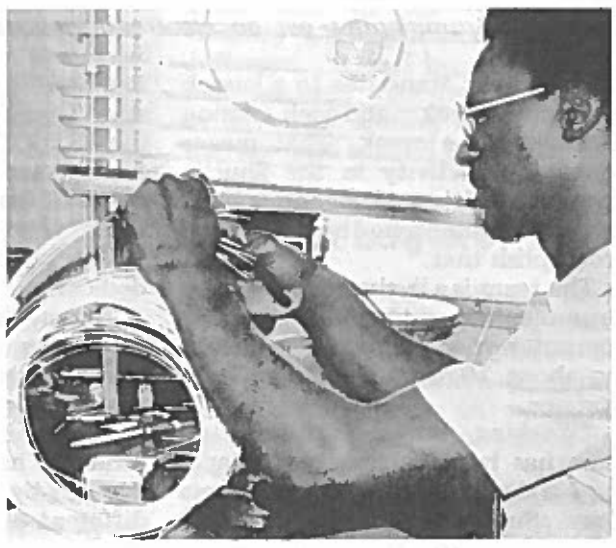
Charlie Kelley, foreman of the wire room, points out that not everyone is cut out to work in the wire room. You have to be a meticulous person who can work with very small units and circuits, he adds. It's a job that demands attention to detail. That turns into quite a challenge when you are assembling scores of wires into an aircraft harness.

The wire room team is split into four groups: Mohawk program under leadman Jim Selph; A-6 and EA-6B Pallets and Pylons under Mike Regan; A-4, F-14 & KA-6D under Bill Bradley; and KA-6D, A-6, EA-6B, E-2C under Jim Schrewsbury.



Stamp of workmanship. *Dennis Glass cuts and stamps wire used in various aircraft electrical cable assemblies.*

Mohawk contributor. *Diana Dotson fabricates DIT-MCO cables and electrical cable assemblies for the OV-1D.*



A slice of work. *Jerome Wilson assembles electrical harnesses for E-2C wings, Falcon jets, and electrical panels for the A-6E.*

A Texas-size welcome for Grumman

HOUSTON, Texas — The nation's fifth-largest city is noted for sweltering heat, an impressive skyline, and the world's first air conditioned sports stadium.

Recently, the Houston area has also given a big Texas welcome to a team of 30 Grummanites from Long Island, in town to observe work being done at Johnson Space Center (JSC). Their observation will enable Grumman to bid for the Space Transportation System Operations Contract (STSOC), which the National Aeronautics and Space Administration is slated to award in fall 1985.

The team has set up shop down the hall from the Grumman Corporation Southwest Regional Office — in a building right across the street from JSC. The place has some of the flavor of a proposal center, though that stage is still months away. There's excitement as the team helps do the footwork for what might become a big, brand-new Grumman program.

"One of STSOC's goals is to support routine space flights," says Tom Kelly, vice president, the director of the STSOC team. "Twenty-four shuttle launches per year,

Teamwork. *Part of the STSOC team visits Johnson Space Center. Shown (L to R) are Mike Dalke, Gerry Glinka, Gary Charpentier, Phil Cohen, Gregg Maslak, Ron Severa, Patrick Pavlicin, Fred Treubig, Jim Grey, Tony Moors, Fred Precht, and Bob McConaughy.*

Howdy. *Grummanites get an electronic welcome at Astrodome.*

NASA's goal, translates to a launch every other week — and each mission lasts almost a week. That means continuous activity in the Shuttle program. . .It's a tremendous challenge to determine how best to accomplish that."

The team is a lively mix of veteran Grummanites and younger, heavily computer-oriented people — including about 10 from Grumman Data Systems.

"Working on the observation team has been extremely challenging and interesting," comments Gray Smith, a project engineer from Plant 35. He is engineering group leader for the team. It's a busy assignment — Smith's work day begins at 8 a.m. and goes until 7:30 or 8 each night, including Saturdays. But he's used to it, having worked before for the Lunar Module (LM) program in Florida and for the Tokamak program in Tennessee and New Jersey.

"One thing I like about working here is the customer: NASA," says Gregg Maslak, who is assessing STSOC's configuration data management requirements. "There's a lot of innovation in NASA, and some very intelligent people. I've always been impressed by their dedication, too."

Karen Young, one of three secretaries in the office, keeps extremely busy producing finished reports for most of this team of technical experts. She stays late in order to have weekends off. "The days go by very fast. . .It's a totally different atmosphere than where I usually work (in Plant 25 on the E-2 program). After work and on weekends, there's plenty to do in Houston — that is, if you've got the energy left to do it!"

Patrick Pavlicin of GDS Operations Planning is in Houston to get data pertaining to all computer operations and facilities STSOC will encompass. He likes the fast work pace — but, he says, the easygoing Houston lifestyle outside the office provides a welcome contrast. Home — several garden apartment complexes — is a short drive away for most of the Grummanites.

"We've been taken care of so nicely by the company, that helps," he says. "So, we can concentrate much better on our work."

Adds Maslak, "You take people out of their normal working environment, you take away all their worries, and they'll really end up giving their 110 percent."

Group dynamics

The team is close knit, both in and out of the office. Every Thursday night, they pick a local restaurant for dinner. Their new Houston friends — from Grumman Corporation, Grumman Houston, as well as the several local people hired on to the team — come along for the fun.

One of the highlights of the group's visit came on July 17, when the New York Mets played the Houston Astros in the Astrodome. The Grummanites chipped in and rented a bus for the occasion. But the Long Islanders were in for a disappointment — the Mets lost 3-2.

On most weekends, there's a barbeque going at one of the complexes. Weekends are also a good time for day tripping. Smith and his wife have been to Austin several times, and to nearby Galveston.

Pavlicin is impressed with downtown Houston. "Normally I don't like city life. . .I went one night to a symphony concert in a park, and another night for a formal evening out. That's something I had always wanted to do, but in New York, it would be too much of a hassle."

Pavlicin recently married Rosalie Monti of GDS, the first STSOC wedding.

Water is abundant in the area — a pleasant shock for many of the Long Islanders. Maslak expected the landscape to be "a lot of cactus" and was surprised to find sailing nearby. Maslak, Pavlicin, and a few others also took a canoe trip recently down a river near San Antonio.

Young isn't wild about Texas waters, though. "Our beaches on Long Island are much nicer," she comments. "You don't get tar on your feet when you go into the water."

Keeping pace. *Karen Young describes her work as a hectic but enjoyable assignment.*

The one aspect that the Long Islanders like most about Houstonians is their friendliness. "A lot of the people here have moved from somewhere else," Young notes. "Their friends become like their family. So they're more eager to socialize and make new friends."

Early stages

The request for proposals (RFP) for STSOC is expected to come in February, with proposals due two months later. The job would actually begin in early 1986. So, the Grummanites have a lot of time to decide whether they like Texas.

Other observation teams are in town, too. They include Ford Aerospace, teamed with McDonnell Douglas, IBM, and Computer Sciences; Rockwell, teamed with Bendix and Systems Development Corporation; and Lockheed.

"I'd say we at Grumman have a very good team — but it has to be," Kelly remarks. "We're up against some very strong competitors!"

scorecard

Golf kicks

Duffers of all ages, male and female alike, have made the Grumman Recreation Golf Championship and Kickers Tournament an annual Success for over 20 years. This year the August 14 tourney attracted a full house of 144 Grummanite golfers to the links at the Rock Hill Country Club in Manorville, Long Island.

After a long day of driving and putting on what was described as a very fast course, Grummanites Joe Gambino, Bob Murray and Pat Regina proved to be the best in a field of very competitive golfers with scores of 76, 73 and 97, respectively.

Joe Gambino, a layout mechanic in Plant 3, took top honors in the men's low gross category with his score of 76. A Grumman varsity golf team player "on and off" for the last 15 years, Joe says he had expected to play better than he did. "My score was about average for me I guess. I had hoped to play better, but it was my first time on the Rock Hill course. Still, I am very pleased with the victory."

Low gross seniors category winner Bob Murray was also pleased with his victory. Bob's 73 was the lowest overall score for the tourney. A Plant 7 flight test instrumentation engineer, Bob was a member of the varsity golf team from 1980-82 until he moved out to Calverton. "I still play in the league out here and try to keep my game form," he says. "I started putting the ball real well early in the game and was fortunate enough to be able to play conservatively and not run into any problems for the rest of the round. The course conditions were very playable also," he adds.

Pat Regina, a paymaster in the Grumman headquarters building, says she was "very happy with my score and my victory," after taking the low gross women's category title with her round of 97.

Pat has been playing golf for about five years and walked a few rounds as an alternate on the Grumman women's varsity golf team this year. "The Kickers tournament was the first time on the Rock Hill course for me and I found it very hilly with fast greens. Placement was the key on that course, and my putting really came through for me for a change," said Pat.

The remainder of the tournament's trophies went to: second low gross men — Don Waller, Jr.; second low gross seniors — Mark Goss; second low gross women — Karen Hassen; low net men — Art Donato; second low net men — Joe Alario; low net seniors — Howard Frazier; second low net seniors — Tom Rozzi, Sr.; low net women — Tony Arenzalo, second low net women — Dee Gruno; low net callaway men — Charlie Smith; second low net callaway men — Ernie Pinino; low net callaway women — Lottie Lewis; second low net callaway women — Laurie Drake; closest to pin women — Dee Gruno; closest to pin men — Tom Rozzi Sr.; longest drive men — Charlie Smith; longest drive women — Tony Arezalo.

Summer greenery

The Plant 43 cafeteria was festooned with flowers, ferns and fauna of all kinds on Thursday, August 16, for the Great River Flower and Plant Show. The event drew 100 entries in nine different categories.

Fine fern. *Anthony Millet took Best of Show honors at the Great River Flower and Plant Show, with his giant Boston fern.*

Great River Operation's deputy general manager, Rudy Avitabile, was on hand to present the best of-show award to Anthony Millet for his huge Boston fern. Anthony, a Plant 35 industrial hygiene technician, credited his living on the water in Sayville and strong sunlight from a southern exposure for the prodigious growth of his Boston fern. "Boston ferns require high humidity and relatively strong sun exposure and I found a perfect location to hang my plant. Living on the water really helped," he said.

Anthony also entered his fern in the Bethpage Flower Show earlier this summer, placing third, "Since then it has grown considerably and really filled out. I don't know when or if it's going to stop growing," he added.

Other flower show winners were: seasonal singles — Peggy Hamak; roses — Roy Goddard; african violets — Myrtice Holland: vegetables — Dennis Winkler; arrangements — Betty McLean; Novice — Stanley Pancir; general houseplants — Ray Pagles; hanging basket — Anthony Millet; houseplants — Barbara Larell.

Hobby Show '84

If you have a hobby then there is probably a category for you to enter in the annual Recreation Hobby Show to be held in Plant 28A on Thursday through Sunday, October 11-14.

Entries will be accepted Monday; Tuesday and Wednesday, October 8-10, from 12 noon to 1 p.m. and again from 4-6 p.m. Participants can place two entries in any one category with a maximum of six total entries in all categories. Coin exhibits are limited to one display case.

The list of categories includes: Ceramics; Collections (coins, stamp, and miscellaneous); Crocheting; Embroidery/Crewel; General; Knitting; Hooked Rugs; Metal Work; Models (miscellaneous); Model Planes (flying — scale); Model Planes (flying — non scale); Model Railroads (Rolling stock); Model Railroads (roadside scenery); Needlepoint; Sewing/Quilting; Ship Models (kits); Ship Models (original design or scratch built); Wood Carving; and Woodworking.

Awards will be given for originality and workmanship with a $100 bond going to the best-in-show and ribbons for first, second and third place to be presented on Friday, October 12.

Further information can be obtained from Ellen Drasser of Recreation, Ext. 52133. In Calverton, contact Barbara Homrighouse, Ext. 117-6519; in Great River, contact Cheryl Hirsch, Ext. 113-6047.

Pair of aces. *Great River Operations is sporting two hole-in-one hitters from the same department this summer. The sharpshooting duffers are sheetmetal mechanics Tom Trifaro Jr. (L) and Ray Perticaro.*

Link aces

Great River sheetmetal mechanics Tom Trifaro Jr., and Ray Perticaro not only shared Plant 43 work department 2016 this summer, but also the distinction of having each scored an "ace" in separate rounds of golf.

Though both duffers play in GRO's Thursday night "Moonshiners" golf league, neither scored their hole-in-one in league play. Ray sank his perfect shot in a leisurely round played at the West Sayville golf course on the par three, 123-yard 17th hole. "I used my seven iron and I guess everything just came together for that one perfect swing," he commented.

Tom says his perfect shot came on a Thursday outing just one week before the start of league play. He used a nine iron for the 149-yard 15th hole of the Heatherwood Country Club golf course in Port Jefferson. "I had been hitting the ball real well that day. It was one of my best scoring days ever and the ace just topped it off for me," he said.

Midweek bowlers

Since it moved to South Levittown Lanes from Woodbury Lanes, the Grumman Black League has lost some of its bowlers. They now need replacements to meet the Lanes' four-team, four-person-per-team league requirement.

The season began Wednesday, September 5 at 6 p.m. Anyone interested in joining the Black League can call its president, Joe Gallo, at Ext. 52316, or secretary Jack Damico at Ext. 57085.

Retirees party heartily

The mercury hit 90 degrees by high noon, but it didn't seem to faze the picnickers at McKay Field on Wednesday, August 15. Hundreds of Grumman Retiree Club members gathered there for their annual club picnic. Even some of the snowbirds showed up to meet and chat with old friends.

The beer flowed; the hamburgers and hot dogs went fast. Nutrition-conscious retirees brought along baskets of fruit. Some boasted that the fruits came from their own gardens. "There is plenty of time for gardening now," said one attendee. His wife just smiled and rolled her eyes.

Good-natured kidding was the order of the day. One retiree playfully tapped the beer belly of another. One dapper gent flung his arms around a younger woman and proclaimed, "What wife? I ditched her years ago and married this babe." His wife of two score elbowed him in the ribs.

It was also an opportune time to renew old friendships that were born years ago, when lathes and hammers were the tools of the trade and duckweights adorned the drafting boards. While talk of the good ole days was a good way to strike up a conversation, picnickers also chatted about more pressing matters: the Mets, the fishing trip in September, the annual trek to see fellow Grumman retirees later this year in the sunny climes of Florida.

If you are a Grumman retiree and wish to join this elite club, contact Ellen Drasser of Recreation. Her address is Grumman Aerospace Corporation, A01-28A, Bethpage, N.Y. 11714; telephone number is (516) 575-2269.

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